striking scenes at various points of the journey. Mr. Whittier has written an introduction to the volume.

— Ginn & Co. announce, in the Library of Anglo-Saxon Poetry, Vol. VI. "Cynewulf's Elene," edited by Charles W. Kent, M.A. The introduction of this work will contain an account of the manuscript, author, sources, theme of poem, etc., as well as a discussion of the versification, particularly of rhyme. The text is accompanied by the Latin original at the foot of each page. The notes, intended as aids to the student, will be full, and frequent reference will be made to Cook's Sievers' "Grammar."

— Mr. E. I. Brill of Leyden, Holland, announces the publication of J. Büttikofer's work on "Liberia," founded on investigations made in 1879–82 and 1886–87. At the present time, when the suppression of African slave-trade attracts so much attention, a study of the republic of Liberia will be very welcome to many readers, and Americans will be particularly interested in it on account of the enormous amount of labor and money devoted by our countrymen to the establishment and development of this republic. The author, who has devoted much of his time to studies on the natural history and ethnology of this country, gives a description of his journey, and sketches of life in the republic, as well as among the little-known aboriginal tribes. The illustrations are taken from photographs and sketches made by the author.

— Little, Brown, & Co. have now ready a volume entitled "The United States," by Professor J. D. Whitney. The volume is made up from the article written for the "Encyclopædia Britannica," modified in such a manner that it appears as originally written, with the facts and figures illustrating the physical geography of our country and its material resources, corrected down to the beginning of the present year. They have also just issued the index volume to the "Encyclopædia Britannica," completing the work.

— "Bell Hangers' Hand-Book," by F. B. Badt, is just the book for those engaged in selling, installing, or handling electric batteries, electric bells, elevator, house, or hotel annunciators, burglar or fire alarms, electric gas-lighting apparatus, electric heat-regulating apparatus, etc. It is said to be the only book of the kind, and is published by the Western Electric Company, Chicago.

— E. & F. N. Spon will issue shortly, "Sewerage and Land Drainage," by George E. Waring, jun., and announce as in press "A Theoretical and Practical Treatise on the Strength of Beams and Columns," in which the ultimate and the elastic limit strength of beams and columns is computed from the ultimate and elastic limit compressive and tensile strength of the materials, by means of formulas deduced from the correct and new theory of the transverse strength of materials, by R. H. Cousins. This firm further announces a "Treatise on Water-Supply, Drainage, and Sanitary Appliances of Residences: including Lifting Machinery, Lighting and Cooking Apparatus, etc.," by Frederick Colyer; and "The Voltaic Accumulator; an Elementary Treatise," by Emile Reynier, translated from the French by J. A. Berly, C.E.

LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

A New Mountain of the Bell.

I HAVE just returned from a journey of four weeks in the Desert of Mount Sinai, made with the especial object of studying the Jebel Nagous in connection with the joint researches of Dr. Alexis A. Julien and myself on musical sand. The "Mountain of the Bell" is situated on the Gulf of Suez, about four hours and a half from Tor by the roundabout camel-route. It was first described by Seetzen in 1808, since which time it has been visited by Ehrenberg, Gray, Wellstedt, Rüppell, Ward, Newbold, and the late Professor Palmer, as well as by large numbers of pilgrims. My observations confirm in the main their accounts of the acoustic phenomena heard, but my measurements differ widely from those of all the travellers save Professor Palmer,

The name "Jebel Nagous" is given by the Bedouins to a mountain, nearly three miles long and about 1,200 feet high, composed of white sandstone bearing quartz pebbles and veins. On the western and northern sides are several large banks of blown sand inclined at high angles. The sand on one of these slopes at the north-west end of the mountain has the property of yielding a deep resonance when it slides down the incline either from the force of the wind or by the action of man. This bank of sand I distinguished from the others by calling it the "Bell Slope." It is triangular in shape, and measures 260 feet across the base, 5 to 8 feet across the top, and is 391 feet long (high). It has the high inclination of 31° quite uniformly. It is bounded by vertical cliffs of sandstone, and is broken towards the base by projecting rocks of the same material. The sand is yellowish white, very fine, and possesses at this inclination a curious mobility, which causes it to flow, when disturbed, like molasses or soft pitch, the depression formed being filled in from above and advancing upward at the same time. The sand has none of the characteristics of sonorous sand found on beaches. When pulled downwards by the hands, or pushed with the feet, a strong vibration is felt, and a low note is plainly heard resembling the deep bass of an organ-pipe. The loudness and continuity of the note are related to the mass of sand moved, but I think that those who compare it to distant thunder exaggerate. The bordering rocky walls give a marked echo, which may have the effect of magnifying and prolonging the sounds, but which, as I afterwards ascertained, is not essential. There are no cavities for the sand to fall into, as erroneously reported. The peak of Jebel Nagous rises above the Bell Slope to the height of 955 feet above the sea-level, as determined by a sensitive aneroid.

After studying the locality and phenomenon for several days, I formed the opinion that it could not be unique, as hitherto supposed, and accordingly I tested every steep slope of blown sand met with on the caravan-route northward to Suez. On April 6 I examined a steep sand-bank on a hillock only 45 feet high, and was rewarded by the discovery of a second Nagous. This new Nagous is in the Wadi Werdan, only five minutes off the regular caravan-route, and one and a half days by camels from Suez. The hillock is called by the Bedouins "Ramadan," and forms the eastern end of a range of low hills about one-quarter of a mile long. Being the only hills in the Wadi, the locality can easily be found by travellers. The hills consist of conglomerate and sandstone, and towards the west of gypsum. They slope up gradually from the north, and end in bold cliffs on the south side. Sand blown by the north wind is carried over the cliffs, and rests on the steep face at two inclinations, — 31° above, and 21° or less below. By applying the usual tests with the hands to the fine-grained sand, I found, that, wherever it lies at the requisite angle to produce mobility (31°), it yielded the bass note, though not so loud as on the Bell Slope of Jebel Nagous. In one instance my friend and fellow-traveller, Henry A. Sim, Esq., of the Madras Civil Service, who kindly aided me in my investigations, heard the sound while standing 100 feet distant. The Nagous sand occurs at intervals throughout the quarter-mile of low cliffs; the main bank at the east end being 150 feet wide and 60 feet high, measured on the incline. I stirred up the sand pretty thoroughly on this slope, and the next day it failed to give the sounds, not having recovered its properties. The intervening night was very cold (53°).

I feel confident that this phenomenon is not very rare in the desert, though the spontaneous production of sounds by sliding of the sand without man's agency, as at Jebel Nagous, may be. Whether the Rig-i-Rawan north of Cabul is caused by similar conditions remains to be determined, but I am informed that the peculiar relations existing between England and Russia will prevent my visiting northern Afghanistan at present.

The Bedouins who accompanied us were greatly astounded at my discovery of a new Nagous, and I fear that their faith in a monastery hidden in the bowels of Jebel Nagous has received a severe shock.

It is interesting to note that the Nagous, or wooden gong, is in daily use in the monastery of St. Catherine, Mount Sinai. I photographed Jebel Nagous and vicinity, as well as my new Nagous, and collected specimens of the rocks, sand, etc. This is merely a preliminary notice, fuller details being reserved for the work on musical sand in preparation by Dr. Julien and myself. I shall be

obliged if those having opportunities of examining banks of dry and fine sand, inclined at 31°, in the arid regions of the West, will report through your columns whether they yield deep sounds when disturbed. H. CARRINGTON BOLTON.

Cairo, Egypt, April 10.

Rainfall and Latent Heat.

IT is probable that no element engaged in the increase of energy in storm-formation, according to ordinary theories, exceeds in importance that of heat set free in the condensation of vapor. Professor Espy was one of the first to enunciate this principle, and to insist upon its entire adequacy to account for all the phenomena even in the most violent tornadoes. Professor Ferrel has said, "Even if any part of the atmosphere should receive such an [primitive] impulse as to produce a most violent hurricane, friction would soon destroy all motion, and bring the atmosphere to rest. Hurricanes, then, and all ordinary storms, must begin and gradually increase in violence by the action of some constantly acting force. . . . This force may be furnished by the condensation of vapor ascending in the upward current in the middle of the hurricane, in accordance with Professor Espy's theory of storms and rains. According to this theory, all storms are produced by an ascending current of warmer atmosphere saturated with moisture, and this current is kept in motion by the continual rarefaction of the atmosphere above by means of the caloric given out of the vapor which is condensed as it ascends to colder regions above."

Professor Mohn gives this calculation of the effect of latent heat set free on Oct. 5, 6, and 7, 1844: "The Cuban hurricane has used for the moving of the air which was rushing in during those three days at least 473,500,000 horse-power; that is, at least fifteen times as much as all wind-mills, water-wheels, steam-engines, locomotives, man and animal power, on the whole earth produce in that time. Whence comes this immense power? From the latent heat of the vapors which rise in the middle of the hurricane, and are condensed during this process. A rainfall of one millimetre (.04 of an inch) per day on a circular surface eight geographical miles in radius would be sufficient to produce, by the liberating of the latent heat in the vapor, the force which the Cuban hurricane displayed in the air-cylinder mentioned above."

These examples will serve to show the views held by two of the most prominent writers on this subject. I have examined the writings of more than twelve scientists, and find that all, without exception, emphasize the importance of this effect. Diligent search has been made in all quarters for a quantitative determination of this effect, but without success. It has seemed of some importance to make a beginning at such analysis, even though, as will readily be seen, the subject is an exceedingly difficult one to elucidate. The following proposition is presented: —

There can be no considerable condensation from saturated air as long as latent heat is set free from it. A short computation will show that the condensation of a grain of water will set free enough latent heat to raise a cubic foot of saturated air about seven degrees in temperature. Let us imagine it to be possible to condense one-seventh of a grain of moisture out of a cubic foot of saturated air at 80° without changing its temperature: latent heat would immediately be set free, and would just re-evaporate the moisture. It would seem at first sight as though this would always be the result, and hence that no precipitation could ever occur without the intervention of some other force. At all events, the proposition above seems abundantly proved.

Suppose, however, that we try to abstract enough heat to lower the temperature one degree. We shall find, that after abstracting enough heat to lower the temperature one-third of a degree, and to condense .111 of a grain of moisture, the rest will be needed to balance the latent heat evolved by the condensation. We shall then have our air saturated at 79.7°, and a precipitation of .111 of a grain. It might be thought that this process could continue indefinitely, but this is not the fact. If we inquire how the above cooling has been possible, we find at once that it has been brought about by heating the surrounding air. I think we can best see this by imagining two cubic feet of air at 80°, side by side and yet distinct. Suppose that, instead of raising the surrounding air, all the heat abstracted in cooling the first cubic foot be passed into the second. We shall then have one cubic foot of saturated air at 79.7°, and another of unsaturated at over 80°. If, now, we mix these, we shall have two cubic feet of unsaturated air at over 80°, and this will need quite a cooling before any further precipitation.

Of course, in nature no such sudden transitions as these occur, but the principle seems to be the same in all cases. The results following such a process are far-reaching and most important, but there is no space here for dilating further upon the question. It seems to me, after a most careful study of the problem, that we have virtually, in an ascending current, an analogous effect to that in mixing two bodies of air at different temperatures. In the latter case it is admitted by all meteorologists that no considerable precipitation can ever occur. If this computation be true, we have a most important deduction, and have apparently wiped out at a single stroke one of the main-stays of theoretical meteorology as now taught. I confess to great diffidence in advancing this computation; but if it shall result in the development of the true principles involved, and a quantitative determination of the effects in many other theories now on an exceedingly unsubstantial basis, I shall be only too glad to be proved in error. H. A. HAZEN.

Washington, D.C., April 29.

"Alphabetic Law" and "World-English."

MR. MATTHEW MONROE CAMPBELL, a retired teacher, resident in Boulder, Col., has issued a series of open letters, advocating the official establishment of "Alphabetic Law" in the writing of English, under the direction of a government bureau. "Alphabetic Law," Mr. Campbell says, "requires (1) a single sign or letter for each sound; (2) a single sound for each sign or letter; (3) a joint name for each sign and its sound (its own sound must be the name for a letter); (4) to ortho-graph, or right-write a spoken word, is simply to change each sound in the word for a letter named after it; (5) to ortho-ep, or right-voice a written word, is simply to change each seen letter back to its unseen sound; a letter, then, cannot have two values, and a letter can never be silent, for a letter is a seen sound."

The idea of enforcing such principles, however excellent, in government printing, or by the authority of a State department, is not likely to meet with favor. The "Alphabetic Laws" are certainly good, so far as they go; and I would point out that they are strictly carried out in the scheme of "World-English." In the latter case, however, they are not proposed for adoption in common orthography, but merely for facilitating the acquirement and the world-wide diffusion of our language. Any thing like a proper and complete phoneticism of ordinary literature is not to be looked for in our day. ALEX. MELVILLE BELL.

Washington, D.C., May 7.

Ayrton and Perry's Secohmmeter.

SCIENCE of April 26 contains a description of Ayrton and Perry's secohmmeter, an instrument consisting of two commutators fixed on the same axle. In your article it is stated that an electrolytic cell will not polarize with rapidly alternating currents, and that consequently the secohmmeter may be employed to measure the resistance of electrolytes in a manner described. May I call your attention to a paper of mine, published in 1882 in the "Transactions of the Royal Society of Canada" (Sec. III. p. 21), in which this method of determining the resistance of electrolytes was, I think, first described? My experience in developing it showed that the electrodes of an electrolytic cell do become polarized, even with very rapidly alternating currents, and that consequently the method which is sketched in your article cannot be trusted to give accurate results. I found, however, that the double commutator, employed in the manner specified in your article, was useful as keeping the polarization at a very small value, and I was able to eliminate the error due to it in the measurement of resistance by introducing two electrolytic cells of the same section, but of different lengths, into two adjacent arms of the Wheatstone's bridge, an adjustable resistance being included also in the arm containing the smaller cell, and by making the other arms consist of wires of equal resistance. J. G. MACGREGOR.

Dalhousie College, Halifax, N.S., April 30.